

4.4 State Appliance Efficiency Standards

Policy Description and Objective

Summary

State appliance efficiency standards establish minimum energy efficiency levels for appliances and other energy-consuming products. These standards typically prohibit the sale of less efficient models within a state. Many states are implementing appliance and equipment efficiency standards, where cost-effective, for products that are not already covered by the federal government.¹³ States are finding that appliance standards offer a cost-effective strategy for improving energy efficiency and lowering energy costs for businesses and consumers.

As of November 2005, 10 states (Arizona, California, Connecticut, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Washington) have adopted standards for 36 types of appliances. Four states (Maine, New Hampshire, Pennsylvania, and Vermont) are considering adopting standards.

Appliance efficiency standards have been an effective tool for improving energy efficiency. At the federal level, the U.S. Department of Energy (DOE) has been responsible for setting minimum appliance standards and test procedures for an array of residential and commercial appliances and equipment since 1987. As of 2000, federal appliance efficiency standards had reduced U.S. electricity use by 2.5% and carbon emissions by nearly 2%. By 2020, the benefits from existing standards are expected to more than triple as the stock of appliances and equipment is replaced by more efficient models (Geller et al. 2001). The appliance standards for 16 products established by the Energy Policy Act of

Appliance standards save energy and generate net benefits for homes, businesses, and industry by reducing the energy cost needed to operate equipment and appliances.

2005 (EPAAct 2005) are expected to yield an additional 2% savings in total electricity use (ACEEE 2005a).

Efficiency standards can play a significant role in helping states meet energy savings goals. In New England, for example, a package of state standards is expected to reduce load growth by 14% from 2008 to 2013 and cut summer peak demand growth by 33% (Optimal Energy 2004).

States are also finding that appliance standards have low implementation costs because the existing standards of states like California can be leveraged.

Objective

The key objectives of appliance efficiency standards are to:

- Raise the efficiency of a range of residential, commercial, and industrial energy-consuming products, where cost-effective.
- Overcome market barriers, such as split incentives between homebuilders and homebuyers and between landlords and tenants, and panic-purchase situations where appliances break and must be replaced on an emergency basis. In a panic purchase, customers usually don't have the time to consider a range of models, features, and efficiency levels.
- Ensure energy use reductions to prevent pollution and greenhouse emissions, improve electric system reliability, and reduce consumer energy bills.

¹³ Under certain conditions, states can exceed a federal standard for a federally covered product; overall, however, federal law is preemptive. For example, in the case of building codes, a state can create a building code compliance package in which a furnace is at a higher efficiency than the federal standard. However, the state must also provide a compliance path under which the higher-efficiency furnace is not required. Thus, the option to exceed federal standards is indirect and is typically only possible in the case of building codes. In addition, states cannot ban lower efficiency products.

Benefits

In addition to saving energy, appliance and equipment standards help reduce pollutant emissions, improve electric system reliability, and save consumers and business owners significant amounts of money over the life of the equipment. As of 2000, federal standards had reduced U.S. electricity use by 2.5% and U.S. carbon emissions from fossil fuel use by nearly 2%. Total electricity savings from already adopted federal standards are projected to reach 341 billion kilowatt-hours (kWh) per year or 7.8% of the projected total U.S. electricity use in 2020 (Geller et al. 2001). The appliance standards in the EPAAct of 2005 are expected to result in additional savings of 90 billion kWh or 2% of projected total U.S. electricity use in 2020 (ACEEE 2005a). The potential savings from five products that are not currently covered by

federal law or designated under the EPAAct for standard setting by DOE are estimated to be 24.4 terawatt-hours (TWh)¹⁴ of electricity and about 4 quads¹⁵ of primary energy¹⁶ in 2030 if implemented nationally, generating \$14.6 billion in net savings for consumers and business owners for equipment purchased through 2030. These standards are also very cost-effective, with a high benefit-cost ratio, as illustrated in Table 4.4.1 (Nadel et al. 2005).

The direct economic and environmental benefits of state standards are also substantial. One study of 19 California product standards projects savings to California consumers and businesses of more than \$3 billion by 2020 and estimates that these standards will reduce the need for three new power plants (ASAP 2004).

Table 4.4.1: Estimated Energy Savings and Economics of Appliance Standards Not Covered by Federal Law

Products	Effective Date (year)	National Energy Savings in 2020 (TWh)	(tril. Btu)	National Energy Savings in 2030 (TWh)	(tril. Btu)	Cumulative Savings for Products Purchased thru 2030 (quads)	Net Present Value ^a for Purchase thru 2030 (\$ billion)	Benefit Cost Ratio
Digital cable and satellite boxes	2007	1.4	14	1.4	14	0.4	1.2	4.1
Digital television adapters	2007	0.3	3	0.0	0	0.2	1.1	7.4
Medium-voltage dry-type transformers	2007	2.7	28	4.7	47	0.6	2.4	5.5
Metal halide lamp fixtures	2008	9.0	93	14.4	144	1.9	7.3	10.8
Reflector lamps	2007	3.9	40	3.9	39	0.9	2.6	4.1
Total		17.3	178.0	24.4	244.0	4.0	14.6	

^a Net Present Value is the value of energy savings due to standards minus the additional cost of more efficient products, expressed in current dollars. A 5% real discount rate was used for these calculations.

Source: Nadel et al. 2005.

¹⁴ One TWh is a billion kWh.

¹⁵ A quad is a quadrillion Btus. By way of comparison, the entire United States currently uses a total of about 100 quads annually in all sectors of the economy.

¹⁶ Primary energy includes the energy content of the fuel burned at the power plant and not just the energy content of electricity as it enters a home or factory. Typically, about three units of energy are consumed at the power plant in order to deliver one unit of energy to a home. The remaining energy is lost as waste heat from the power plant and along the transmission and distribution system.

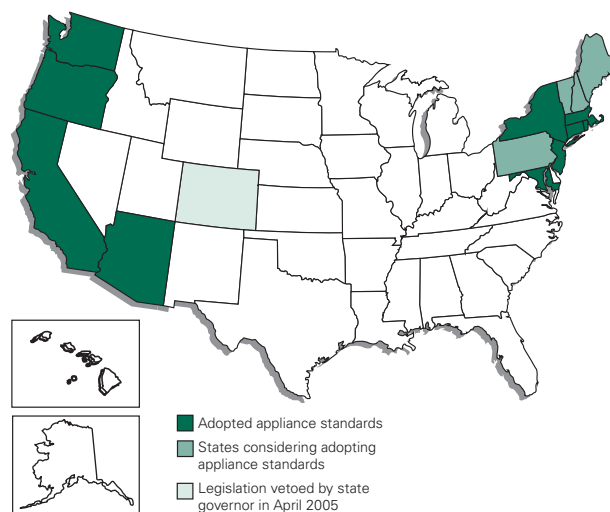
States with Appliance Efficiency Standards

A number of states have either implemented appliance standards or are considering implementing them, as shown in Figure 4.4.1. California's appliance standards program dates to the 1970s, when the state began to pursue standards before the enactment of federal legislation. When the federal government opted not to issue standards under its legislative mandate in 1982, other states joined California and developed state standards. These state initiatives helped create the consensus for new federal legislation in 1987 (the National Appliance Energy Conservation Act or NAECA) and the Energy Policy Acts of 1992 and 2005. While the NAECA preempted state action on federally covered consumer products (with limited exceptions as discussed later), California has continued to develop efficiency standards for other products and technologies.

California's appliance efficiency standards are estimated to have saved about 2,000 megawatts (MW) (about 5%) of peak electricity load in 2001. As shown in Figure 4.4.2, this represents 20% of California's total peak load savings from all energy efficiency programs. The standards cover 30 products (plus three additional products for which standards or revised standards are pending) and have saved consumers and businesses millions of dollars (Delaski 2005).

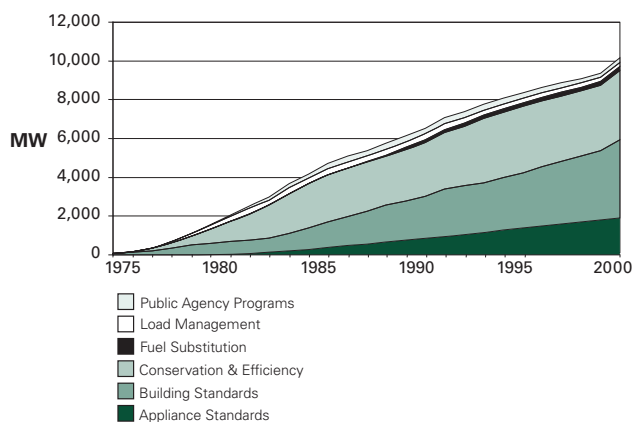
Additional states have recently enacted efficiency standards. These include Arizona, Connecticut, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Washington. Table 4.4.2 lists adopted and pending efficiency standards by state. In setting equivalent or stronger standards at the national level for the shaded products in Table 4.4.2, the EPAAct of 2005 preempts additional states from setting standards for these particular products. States that enacted standards prior to EPAAct 2005 will enforce their state standard up until the equivalent or stronger federal requirements go into effect.

Figure 4.4.1: States with or Considering Appliance Standards



Source: Compiled by Stratus Consulting Inc.

Figure 4.4.2: Load Savings from Appliance Efficiency Standards As Compared to Other Energy Efficiency Programs in California



Source: Motamedi 2005 (based on CEC data).

Table 4.4.2: States with Adopted or Pending Appliance Efficiency Standards

Products	AZ	CA	CT	MA	MD	NJ	NY	OR	RI	WA
Boilers and central furnaces not covered by federal standards		X		X						
Ceiling fans and ceiling fan lights ^a					X		X			
Commercial clothes washers	X	X	X		X	X		X	X	X
Commercial hot food holding cabinets		X								
Commercial ice-makers ^b	X	X					X	X	X	X
Commercial reach-in refrigerators and freezers ^b	X	X	X		X	X	X	X	X	X
Commercial unit heaters	X	X	X		X	X	X	X	X	X
Computer room air conditioners		X								
Consumer audio and video equipment		X					X			
Digital television adaptors		X					X			X
Duct furnaces		X								
Evaporative coolers		X								
Exit signs	X	X	X		X	X	X	X	X	X
External power supplies ^b	X	X		X			X	X	X	X
Freezers (residential, 30 to 39 cubic feet)		X								
General service incandescent lamps not federally regulated		XO								
High-intensity discharge lamp ballasts									X	
Hot tubs (portable electric spas)		X								
Incandescent reflector lamps not federally regulated		O		X			X	X		X
Large commercial packaged air-conditioners	X	X	X		X	X	X		X	
Low-voltage dry-type distribution transformers	X	X	X		X	X		X	X	X
Medium-voltage dry-type distribution transformers				X						
Metal halide lamp fixtures	X	XO		X			X	X	X	X
Pool heaters not covered by federal standards		X								
Pool pumps		X								
Pre-rinse spray valves	X	X					X	X	X	X
Refrigerated beverage vending machines ^b		X								
Small water heaters not covered by federal standards		X								
Torchieres	X	X	X		X	X	X	X	X	X
Traffic signal modules-pedestrian	X	X				X	X	X		
Traffic signal modules-vehicular	X	X	X		X	X	X	X	X	X
Under-cabinet light fixture ballasts		X								
Walk-in refrigerators and freezers		X								
Water dispensers		X								
Water and ground water-source heat pumps		X								
Wine chillers		X								

Key: X=Adopted, XO=Standard adopted and a revised standard is pending, O=Pending.

Note: Products where rows are shaded are state standards preempted by the standards established by EPAAct 2005. EPAAct 2005 also establishes federal efficiency standards for compact fluorescent lamps, residential dehumidifiers, traffic lights, and fluorescent lamp ballasts.

^a EPAAct 2005 sets standards for residential ceiling fan light kits.

^b The specific standards for these products were not established by the legislation; the legislation requires DOE to investigate whether standards are technically feasible and economically justified and to set standards where these criteria are met.

Sources: Compiled from Delaski 2005, Nadel et al. 2005, State of Washington 2005, and other sources listed under Examples of Legislation on page 4-66.

Washington's appliance efficiency standards are expected to result in significant electricity, natural gas, and water savings. An analysis by the state's Department of Community, Trade and Economic Development's Energy Policy Division estimates that the standards on these 13 products will save 136 million kWh of electricity, 2 million therms of natural gas, and 406 million gallons of water in the first year the standards are enacted. Savings grow significantly over time as old products are retired and new products subject to these standards are installed. This report also estimates that by 2020, assuming the standards are in place through that period, natural gas savings would amount to 3% of the commercial sector's consumption and total electricity savings could power 90,000 homes. By 2014, annual water savings from these standards could total up to 2 billion gallons. Standards on pre-rinse spray valves could save 51,205 megawatt-hours (MWh) of electricity, 6,745 therms of natural gas, and 1,785 million gallons of water per year by 2020 (State of Washington 2005).

Designing an Effective Appliance Standards Policy

States have substantial experience with appliance efficiency standards. Key issues they have addressed include: identifying participants, design issues, and linkages with federal and state policies.

Participants

- *State Legislatures.* Establishing efficiency standards in a state typically requires enabling legislation. However, once legislation is enacted, it may allow an executive agency to set further standards administratively. Because legislation has been developed for many standards, state legislatures typically do not need to conduct original research on definitions. Similarly, because several states have established standards for administration procedures, these implementation processes can also be largely replicated from other states' experiences.

- *State Energy Offices.* State energy offices, which typically administer the federal state energy program funds, have generally acted as the administrative lead for standards implementation.
- *Product Manufacturers.* Companies that make affected products clearly have a stake in standards development. Proactive consultations with manufacturers can increase the speed and effectiveness of the development and implementation process. Their expertise can help refine efficiency levels and labeling and certification procedures.
- *Product Distributors, Installers, and Retailers.* Wholesale distributors, installation contractors, and retail vendors are key players in that they must know the technical requirements and labeling and certification rules to be able to participate effectively in standards implementation and enforcement.
- *Customers.* It is important to consider the people who use the affected products during the standard development and implementation processes. Consideration includes assessing benefits and costs to consumers and impacts on product features or market choices.
- *Utilities.* Utilities may provide technical assistance for developing standards and support for implementation. Their relationships with customers and trade allies can also be helpful in educating markets about the effects of new standards. Utilities that operate voluntary efficiency programs may want to coordinate their incentive and education programs, gearing voluntary incentive targets to the standards.
- *Public Interest Organizations.* Groups representing consumers, environmental interests, and other public interests can offer technical expertise and important public perspectives in developing and implementing standards as baselines.

Key Design Issues

- *Defining the Covered Products and Their Energy Efficiency, Applicability, and Cost-Effectiveness.* States have adopted appliance standards that

cover from five to more than 30 products. Some products may not be appropriate candidates for standards if, for example, they have recently been covered by federal law, or they are not appropriate for the state's climate or markets. States target certain products for standards based on their total energy savings potential, technical feasibility, and economic attractiveness. Because technologies suitable for appliance standards are typically already being used in well-known, consistent applications, estimating their energy savings has been relatively straightforward.

- *Assessing Overall Benefits and Costs.* In addition to the economic assessment of individual technologies, states have conducted overall assessments of benefits and costs. Benefits can include energy savings, energy bill reductions, electric reliability benefits, reduction in future energy market prices, and air pollutant and greenhouse gas emission prevention. Costs can include product buyer costs, product manufacturer costs, and program administration costs.
- *Availability of Test Methods.* Test methods are necessary to set efficiency levels for the state appliance standards. Test methods may have been established by federal agencies such as DOE or the U.S. Environmental Protection Agency (EPA), by other states that have already set standards, or by industry associations representing companies that make the products of interest.
- *Defining Certification and Labeling Requirements.* Like test methods, product certification and labeling procedures may have already been established by federal or state agencies or by industry associations. In some cases, it may be necessary for appliance standards regulations to define a labeling or certification method beyond those already established. On the other hand, and in rare instances, technical or market issues may warrant certification or labeling exemptions for certain products. For example, if a standard calls for a simple, prescriptive design change, that feature may be so visible on the product that certification and labeling may not be needed.
- *Establishing Inspection and Enforcement Procedures.* Inspection and enforcement of appliance standards

regulations has typically involved self-policing. Industry competition is usually such that competitive manufacturers report violations. While states may want to reserve the legal right to inspect individual products or installations, it is rare that federal or state agencies have had to institute regular inspection or sustained enforcement actions.

Interaction with Federal Policies

Federal laws, such as NAECA, EAct 1992, and EAct 2005, have established appliance efficiency standards for more than 40 products (see Table 4.4.3 on page 4-60). DOE is currently conducting rulemakings for three of the products listed in Table 4.4.3: commercial packaged air conditioners, residential furnaces and boilers, and dry-type distribution transformers. EAct 2005 directs DOE to set standards for several additional products, including: vending machines, dehumidifiers, external power supplies, commercial refrigeration, and icemakers. States can actively promote efficient models of these products by increasing consumer awareness and developing other programs.

States are preempted from setting their own standards for the products covered by federal standards. State efficiency standards that were established before a product was covered under NAECA are preempted as of the effective date of the federal standard (i.e., the date that manufacturers must comply with that standard). Nevertheless, some states are enacting standards for products that are not yet covered by federal law, for which DOE rulemakings will take place (as directed by EAct), and/or that are being considered for coverage under NAECA, expecting to gain several years of savings in the interim. States can apply for waivers of preemption for products that are covered by federal law. If, for example, they face special conditions, states can cite such circumstances as the basis for a waiver. In September 2005, California petitioned DOE for a preemption waiver to implement a state water efficiency standard for clothes washers. Legislation pending in Massachusetts would require state officials there to seek a waiver from federal preemption allowing the state to implement tougher home furnace and boiler standards.

Table 4.4.3: Products Subject to Existing Federal Appliance Efficiency Standards

Products Included in NAECA 1987	
<ul style="list-style-type: none"> Central air conditioners and heat pumps Clothes washers Clothes dryers Direct-fired space heaters Dishwashers Fluorescent lamp ballasts Freezers 	<ul style="list-style-type: none"> Furnaces and boilers Pool heaters Ranges and ovens Refrigerator-freezers Room air conditioners Televisions^a Water heaters
Products Added by EPAAct 1992	
<ul style="list-style-type: none"> Commercial furnaces and boilers Commercial packaged air conditioners and heat pumps Commercial water heaters Distribution transformers^a Electric motors (1 to 200 horsepower) Faucets and aerators 	<ul style="list-style-type: none"> Fluorescent lamps High-intensity discharge lamps^a Incandescent reflector lamps Small electric motors (< 1 horsepower)^a Showerheads Toilets
Products Added by EPAAct 2005	
<ul style="list-style-type: none"> Automatic commercial ice makers^a Ceiling fans and ceiling light kits Commercial clothes washers Commercial refrigerators and freezers^a Commercial pre-rinse spray valves Compact fluorescent lamps Dehumidifiers External power supplies^a Fluorescent lamp ballasts 	<ul style="list-style-type: none"> High-intensity discharge lamp ballasts Illuminated exit signs Large packaged air-conditioners (> 20 tons) Low-voltage dry-type transformers Torchieres Traffic signals (vehicular) Traffic lights Unit heaters Vending machines^a

^a The specific standards for these products were not established by the legislation; the legislation requires DOE to investigate whether standards are technically feasible and economically justified and to set standards where these criteria are met.

Sources: Nadel and Pye 1996, ACEEE 2005b.

Interaction with State Policies

Appliance efficiency standards interact with other state policies in several ways. Standards set a minimum compliance level, while voluntary efficiency programs help consumers identify products that achieve a high level of energy efficiency. For example, ENERGY STAR specifications for products are significantly higher than minimum standards. The ENERGY STAR program expands the use of highly efficient products by homes and businesses, while standards are used to prohibit the sale of products below an acceptable level. Additionally, standards can interact with building codes by preempting building code provisions related to those equipment types, ensuring that building codes incorporate higher efficiency appliances. In some cases, building codes can be modified to include tradeoffs for equipment that exceed minimum standards or code requirements.

Program Implementation and Evaluation

Many states have learned that they do not need to start from scratch when developing and implementing appliance efficiency standards; in many cases, they can refer to the work already conducted by states with established appliance efficiency standards. For example, states have made minor adaptations to existing legislation based on the product lists and analyses conducted by other states. States have also consulted national and regional organizations with expertise and technical support capability. (For additional information about states' activities, see the *State Examples* section on page 4-62.)

While a state agency can initiate an inquiry into efficiency standards, legislation is typically needed to enable executive agencies to regulate in this area. Once legislatively authorized, states have followed these steps toward successful implementation of appliance efficiency standards:

- **Establish a Stakeholder Process.** Notify affected manufacturers, consumers, utilities, state agencies, and public interest organizations about the

initiative. Develop information materials and hold workshops to inform stakeholders and solicit feedback.

- *Define Covered Products.* Develop a specific list of product and equipment types to be covered by the program. States have obtained lists of eligible products from other states that have recently enacted standards and from national organizations.
- *Conduct Benefit-Cost Analysis and Related Studies.* (See design issues described on page 4–58.)
- *Conduct Rulemaking.* The rule typically defines covered products, effective dates, efficiency standards, test methods, certification and labeling procedures, inspection and enforcement procedures, penalties for noncompliance, procedures for appeals, waivers and other exceptions, and contact information for the agencies involved. A rulemaking also provides formal notice, review, and comment procedures. When enabling legislation authorizes the executive branch to add new products or update standards on covered products, the regulatory process may be reopened after a few years.
- *Monitor, Review, and Modify the Program as Needed.* Based on stakeholder response and market trends, some states have made specific program modifications, including revisions to covered products, efficiency levels, and effective dates, as well as process improvements such as more frequent stakeholder input cycles and more transparent public information processes.

Typical implementation issues include:

- *Effective Dates.* A single date is typically established after which noncomplying products cannot be sold or installed in the state. In some cases, where warranted by product-specific considerations, extra time is allowed for manufacturers or retailers to prepare for the new standards.
- *Test Methods.* A specific method must be defined for testing the efficiency of a given product type. DOE, industry associations, and/or technical societies such as the American Society for Testing Materials (ASTM), American Society of Mechanical Engineers (ASME), Illuminating Society of North America (IESNA), or American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) are typical sources of test methods.
- *Product Certification.* The federal standards program is essentially self-certifying; that is, manufacturers use approved test procedures to attest that affected products comply with standards. Some states, notably California, maintain databases of covered products to identify which models are in compliance with their state standards.
- *Labeling Requirements.* To date, state standards programs have relied primarily on national labeling and other information programs to address the need to label covered products. For example, federal law requires the Federal Trade Commission to operate an appliance labeling program for defined product types, and the DOE/EPA ENERGY STAR programs include certain labeling guidelines. In some cases, industry associations set labeling guidelines for certain products. Labeling issues vary by product type and are resolved on a case-by-case basis.
- *Enforcement.* The federal standards program and the California program are largely self-policing. Manufacturers are expected to provide complying products and competitive forces are expected to prevent violations. Enforcement actions typically depend on market participants to bring violation

Best Practices for Standards Design and Implementation

- *Learn from others.* There are many lessons to be learned from states that have adopted appliance standards.
- *Consult with stakeholders.* Identify key groups early, including product manufacturers, affected retailers and customer groups, advocates, and utilities. Keep stakeholders informed and seek their input regularly.
- *Conduct a benefit-cost analysis* of the proposed standards.
- *Address key issues* such as: covered products, efficiency levels, effective dates, test methods, product certification, labeling requirements, and enforcement.
- *Review and adjust covered product lists* to be sure they are technically and legally up to date.

claims. In the two long-running programs—the federal and California programs—enforcement actions have been rare.

Evaluation

Appliance efficiency standards programs have achieved defined results with minimal expenditure of public funds. Evaluating the benefits and costs of the standards is important during the standards-setting process. Once enacted, little field evaluation is performed.

Depending on the state enabling law, the implementing agency may be empowered to increase standards for affected products and/or to set standards for other product types. These actions are likely to involve detailed technical and economic evaluation. Improvements in the standards-setting process itself can also be considered at such times.

Once a state has operated a standards program for several years, it is helpful to conduct a program review to improve procedures and implement other enhancements.

A key issue for assessment is degradation of savings. Standards are established for a typical assumed application; over time the use of the product or device may change so that the original intent of the standard is not being served, or technology may change to the point that the device is used differently. Consequently, it can be valuable to review the markets and applications in which standards-covered devices are used, to ensure that the standards are having the intended effect. If the market or application context changes sufficiently for a product, the applicable standard may need to be reevaluated.

Other opportunities for evaluation include assessments of energy, demand, emissions, and other impacts over time, both for evaluating effectiveness and for quantifying emissions impacts for air quality or climate policy purposes. A periodic process evaluation of the standards program can also be helpful to ensure that stakeholder participation is appropriate, technical methods are up-to-date and effective, and rulemaking procedures are as transparent and non-bureaucratic as possible.

Best Practices for Standards Evaluation

- Conduct technical and economic evaluation of opportunities to increase appliance standards and/or set standards for new products.
- Review markets and product applications periodically (e.g., every three to five years) to determine whether new or adjusted regulations are needed to avoid degradation of savings.

State Examples

California

California was the first state to initiate an appliance efficiency standards program (in 1977) and maintains the most active and well-funded standards program of any state. California law now covers 30 products; new or upgraded standards are under consideration for three products. Most state standards programs in recent years have used California's covered products, or a subset of these products, and its technical procedures as the basis for their efforts. The California Energy Commission (CEC) operates the standards programs for the state. It develops technical and economic assessments of products recommended for rulemakings, develops draft regulations, holds public participation processes, issues final rules, monitors compliance, and maintains a database of covered products.

California's standards program has contributed to substantial improvements in energy efficiency. The standards in place in the state are currently reducing peak electric demand by about 2,000 MW or about 5% of peak load. These savings account for about 20% of California's total peak demand reductions from all efficiency programs over the past 20 years. By 2010, the 2002 California appliance standards could reduce natural gas consumption by 20.9 billion cubic feet and electricity use by 2,485 million kWh. This translates into a cumulative net savings of \$1.9 billion. The savings could increase significantly by 2020: natural gas consumption would be reduced by 41 billion cubic feet and electricity consumption would be reduced by 7.1 billion kWh, resulting in a cumulative net savings of \$4.3 billion (ACEEE 2000).

California must receive a federal waiver to enact its proposed state standards for residential water heaters and clothes washers, since they would exceed the existing federal standards. California has published standards for NAECA-covered and non-NAECA covered products. However, the CEC appears unlikely to request the waiver for water heaters so the proposed standards are not likely to save energy beyond NAECA levels. On clothes washers, California established a water factor in their standard. This requires a waiver, which the CEC filed on September 13, 2005. If the waiver is granted to CEC, the clothes washers standards could save 17 billion cubic feet of natural gas, 1.1 billion kWh of electricity, and more than \$1.9 billion in cumulative net savings by 2020. Water heater standards could save 19 billion cubic feet of natural gas, 469 million kWh in electricity, and \$761 million in cumulative net savings.

Web sites:

<http://www.energy.ca.gov/efficiency/appliances/index.html>

<http://www.energy.ca.gov/appliances/documents/index.html> (contains documents detailing California's technical and economic analysis process)

<http://www.energy.ca.gov/appliances/appliance/index.html>

http://www.energy.ca.gov/appliances/appliance/excel_based_files/ (contains California appliance data)

Connecticut

Connecticut enacted efficiency standards legislation in 2004 through Senate Bill 145 (S.B.145). This bill covers the following products: torchiere lighting fixtures, building transformers, commercial refrigerators and freezers, traffic signals, exit signs, large packaged air conditioning equipment, unit heaters, and commercial clothes washers. The Connecticut standards are expected to save residents and businesses more than \$380 million in energy costs by 2020, conserve over 430 gigawatt-hours (GWh) of electricity, reduce summer peak electricity demand by over 125 MW, and avoid the emissions of about 65,000 metric tons of carbon (NEEP 2004).

Web site:

http://search.cga.state.ct.us/dtsearch_lpa.html

New Jersey

In 2005, New Jersey enacted energy efficiency standards for nine products. Very similar to the Connecticut bill, the new law sets standards for commercial clothes washers, commercial freezers, illuminated exit signs, very large air-cooled commercial air conditioning equipment, low-voltage dry-type distribution transformers, torchiere lighting fixtures, traffic signal modules, and unit heaters.

Analysis of the bill indicates that New Jersey customers will save hundreds of millions of dollars in energy costs over the next 20 years, while significantly reducing emissions of sulfur dioxide (SO₂) and smog-forming nitrogen oxide (NO_x). The new standards are estimated to reduce New Jersey's annual carbon dioxide (CO₂) emissions by almost 175,000 metric tons, equivalent to removing almost 145,000 cars from the road.

Web site:

<http://www.bpu.state.nj.us/home/home.shtml>

New York

Signed on July 29, 2005, the *Appliance and Equipment Energy Efficiency Standards Act of 2005* establishes state energy efficiency standards for 14 household appliances and electronic equipment not currently covered by federal standards. The products covered under the new law include ceiling fans, ceiling fan light kits, furnace air handlers, commercial pre-rinse spray valves, commercial washing machines, refrigerators and freezers, icemakers, torchiere lighting, unit heaters, reflector lamps, metal halide lamp fixtures, pedestrian and vehicular traffic signal modules, exit signs, and very large commercial air conditioning units. In addition, the law requires the Secretary of State and the New York State Energy Research and Development Authority (NYSER-DA) to set efficiency standards for electronic products that use standby power when they are turned off but remain plugged in (e.g., DVD players and recorders, VCRs, and battery chargers) in an effort to reduce "phantom" energy consumption.

The appliance and equipment efficiency standards are expected to save 2,096 GWh of electricity annually, enough to power 350,000 homes. This equates

to annual savings of \$284 million per year. CO₂ emissions are expected to decrease by 870,000 metric tons annually, NO_x by 1,429 metric tons annually, and SO₂ by 2,858 metric tons annually as a result of the new standards (Pew 2005).

Web site:

<http://assembly.state.ny.us/leg/?bn=A08103>

What States Can Do

Depending on whether authority for efficiency standards already exists, states interested in exploring appliance efficiency standards can begin a new standards initiative, upgrade standards for products currently covered by state law, or expand coverage to new products.

Action Steps for States

States that have adopted appliance efficiency standards can conduct the following action steps:

- Assess whether authority exists to upgrade current standards or set standards for other products. If authority exists, determine appropriate increases in efficiency levels for current standards or appropriate new products and efficiency levels. If authority does not exist, work with policymakers to assess the benefits of allowing the implementing agency to upgrade standards and set standards for other products.
- Develop a list of potential products for which standards could be established and conduct an initial assessment of efficiency levels. Conduct a rulemaking process to determine the final products to cover and the associated efficiency levels. Encourage active stakeholder participation and use

transparent analysis and decision-making procedures.

- Periodically report on program impacts and operations.
- Assess stakeholder communication and participation and revise these processes, if needed.
- Actively promote consumer awareness of appliances for which EPA 2005 directs DOE to set standards.

States that are considering adopting appliance efficiency standards can:

- Review sample legislation, product lists, and analyses available from other states.
- Consult with stakeholders, national and regional associations, and other key parties to conduct preliminary cost/benefit and feasibility analyses.
- Work cooperatively with policymakers to determine whether appliance efficiency standards are an appropriate option.
- Actively promote consumer awareness about the energy cost savings and environmental benefits of appliance standards.

Information Resources

Information About States

Title/Description	URL Address
The California Appliance Efficiency Program. This Web site provides information and resources on California's appliance efficiency programs, including current regulations, rulemakings, a database of energy efficiency appliances, and background information.	http://www.energy.ca.gov/efficiency/appliances/index.html
California Appliance Efficiency Regulations. This Web site provides information on California's appliance standard regulations.	http://www.energy.ca.gov/appliances/2006regulations/index.html
California's Appliance Standards: A Historical Review, Analysis and Recommendations, Staff Report. CEC, Sacramento, 1983.	URL not available.
Energy Efficiency Standards: A Low-Cost, High Leverage Policy for Northeast States. The analysis conducted for this project showed that efficiency standards have very large and highly cost-effective economic, energy, and environmental benefits for states in the Northeast.	http://www.neep.org/Standards/Efficiency Standards Report.pdf
Energy Efficient Florida: Smart Energy Policy That Benefits Florida's Economy and Environment. This document provides information on Florida's clean energy potential.	http://floridapirg.org/FL.asp?id2=10282&id3=FL&
Report on Appliance Efficiency: Incentives and Standards. January 20, 2005. Presented by the Maine Public Utilities Commission (PUC) to the Utilities and Energy Committee, this report reviews alternative methods of using voluntary incentive programs and/or establishing minimum energy efficiency standards. It recommends that the Maine Legislature implement minimum efficiency standards for nine different products.	http://mainegov-images.informe.org/mpuc/staying_informed/legislative/2005legislation/appliance_standards_rpt.pdf

General Information About Appliance Efficiency Standards

Title/Description	URL Address
The American Council for an Energy-Efficient Economy (ACEEE). The ACEEE Web site contains many publications and resources on all aspects of energy efficiency, economic development, and environmental concerns.	http://www.aceee.org
The Appliance Standards Awareness Project (ASAP). This group provides information and resources on federal and states appliance standards.	http://www.standardsasap.org
Codes and Standards White Paper on Methods for Estimating Savings. Mahone, D., N. Hall, L. Megdal, K. Keating, and R. Ridge. 2005. April 7. Prepared by HMG for Marian Brown, SCE in Support of Statewide NRNC MA&E. This paper addresses California building and appliance energy efficiency standards, and the role of codes and standards programs as part of utility portfolios of energy efficiency programs.	http://www.calmac.org/publications/CSWhite_Paper_Final.pdf
The Collaborative Labeling and Appliance Standards Program (CLASP). This program's Web site provides information and resources on developing countries that are pursuing energy efficiency and labeling programs.	http://www.clasponline.org/disdoc.php3?no=289

Title/Description	URL Address
DOE Appliance and Commercial Equipment Standards. This DOE Web site provides information on state and federal appliance standards.	http://www.eere.energy.gov/buildings/appliance_standards/
Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards. Nadel, S., A. deLaski, J. Kleisch, and T. Kubo. 2005. January. This report describes opportunities for state governments to set minimum-efficiency standards for 18 appliances and other types of equipment currently not covered by federal standards.	http://www.standardsasap.org/a051.pdf
Northeast Energy Efficiency Partnerships (NEEP). NEEP's Web site provides information on promoting energy efficiency in the Northeastern United States.	http://www.neep.org
NEEP. Energy Efficiency Standards: A Low-Cost, High Leverage Policy for Northeast States. This Web site provides access to updated information about energy efficiency standards in the Northeastern states.	http://www.neep.org/Standards/index.html
Realized and Prospective Impacts of U.S. Energy Efficiency Standards for Residential Appliances. Meyers, S., J. McMahon, M. McNeil, and X. Liu. 2002. Lawrence Berkeley National Laboratory (LBNL). June. Final Report. This project involved development of an analytical framework to estimate energy, environmental, and consumer economic impacts of federal residential energy efficiency standards.	http://eappc76.lbl.gov/tmacal/esdocs.cfm?iddoc=1072
Smart Energy Policies: Saving Money and Reducing Pollutant Emissions through Greater Energy Efficiency. The report details nine specific policy recommendations that could have a substantial impact on the demand for energy in the United States while also providing positive economic returns to American consumers and businesses.	http://www.aceee.org/pubs/e012full.pdf
What Are Appliance Efficiency and Standards in the States? This DOE Web site provides information and resources on state appliance standards.	http://www.eere.energy.gov/state_energy_program/topic_definition_detail.cfm/topic=101

Examples of Legislation

State	Title/Description	URL Address
Arizona	Appliances and Equipment Energy Efficiency Standards. This bill sets minimum efficiency standards for 15 products.	http://www.swenergy.org/legislative/arizona/HB%202390%20Engrossed%20Bill%20Language.pdf
California	Appliance Efficiency Regulations, 2006. This document provides California's appliance efficiency regulations, and related public comments, hearing transcripts, and other information.	http://www.energy.ca.gov/appliances/2006regulations/index.html
Colorado	A Bill for an Act Concerning Energy Efficiency Standards for Specified Devices (HB 04-1183). This bill sets minimum energy efficiency standards for 14 products.	http://www.swenergy.org/legislation/colorado/HB-1183.pdf http://www.swenergy.org/legislation/colorado/HB-1183_FactSheet.pdf
Connecticut	An Act Concerning Energy Efficiency Standards, S.B.145. This act requires the Secretary of the Office of Policy and Management to establish, by regulation, minimum energy efficiency standards for certain heating, cooling, lighting, and other types of products.	http://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&bill_num=145&which_year=2004&SUBMIT.x=7&SUBMIT.y=7

State	Title/Description	URL Address
Maryland	Maryland House Bill 1030. This bill, which was enacted in January 2004, provides legislative language for Energy Efficiency Standards for 10 products.	http://mlis.state.md.us/2005rs/billfile/HB1030.htm
Massachusetts	Massachusetts Appliance Efficiency Standards Act. Commonwealth of Massachusetts. 2005. Chapter 139 of the Acts of 2005. This act requires establishment of minimum efficiency standards for five products.	http://www.mass.gov/legis/laws/seslaw05/sl050139.htm
New Hampshire	Minimum Efficiency Standards for Certain Products. Senate Bill 105 (S.B.105). State of New Hampshire. 2003. S.B.105-FN. Minimum Energy Efficiency Standards for Certain Products. New Hampshire appliance standards information. This bill, introduced in 2003, establishes state appliance and equipment energy efficiency standards for 10 products.	http://www.gencourt.state.nh.us/legislation/2004/sb0105.html
New Jersey	Establishes Minimum Energy Efficiency Standards for Certain Products. This act establishes minimum energy efficiency standards for eight products.	http://www.njleg.state.nj.us/ (To locate information about the Act, go to Select "Bills 2004–2005" from the left sidebar; select "Search by Bill Number;" and type "A516" into the search box.)
New York	Appliance and Equipment Energy Efficiency Standards Act of 2005. State of New York. 2005. Governor Pataki Introduces the Appliance and Equipment Energy Efficiency Standards Act of 2005. New York appliance standards information. This act establishes state energy efficiency standards for 14 household appliances and electronic equipment.	http://www.state.ny.us/governor/press/year05/april20_2_05.htm
Oregon	House Bill 3363. This act establishes minimum energy efficiency standards for 12 products.	http://www.leg.state.or.us/05reg/measures/hb3300.dir/hb3363.b.html
Pennsylvania	House Bill 2035. General Assembly of Pennsylvania. 2003. House Bill No. 2035. Providing for Minimum Efficiency Standards. Providing for Minimum Energy Efficiency Standards for Certain Appliances and Equipment; and Providing for the Powers and Duties of the Pennsylvania PUC and of the Attorney General. This provides the text for the Pennsylvania bill introduced in 2003.	http://www.legis.state.pa.us/wu01/li/bi/bt/2003/0/hb2035p4640.htm
Rhode Island	S 0540—Energy and Consumer Savings Act of 2005. This provides the text of the Rhode Island appliance standards legislation signed July 1, 2005.	http://www.rilin.state.ri.us/Billtext/BillText05/SenateText05/S0540A.pdf
Vermont	Senate Bill 52. An Act Relating to Renewable Energy Portfolio Standards, Appliance Efficiency Standards, and Distributed Electricity. State of Vermont. 2005–2006. Renewable Energy Goals. Vermont General Assembly, Montpelier. Vermont appliance standards information. This provides the text for the Vermont bill introduced in 2005.	http://www.leg.state.vt.us/docs/legdoc.cfm?url=/docs/2006/bills/senate/S-052.htm
Washington	Senate Bill 5098. An Act Relating to Energy Efficiency. Text of the Washington bill establishing minimum standards and testing procedures for 13 electrical products that are not covered by federal law.	http://www.leg.wa.gov/pub/billinfo/2005-06/Htm/Bill%20Reports/Senate/5098-S.SBR.htm
United States	Energy Policy Act of 2005. This is the text of EAct 2005.	http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h6enr.txt.pdf

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ACEEE. 2005b. The Federal Energy Policy Act of 2005 and Its Implications for Energy Efficiency Program Efforts. Steven Nadel, September 2005. Report #E053 ACEEE.	http://www.aceee.org/pubs/E053.pdf
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NEEP. 2005. Energy Efficiency Standards: A Boon for Maryland. Fact Sheet. Accessed November 9, 2005.	http://www.neep.org/Standards/FactSheets/MDfactsheet.pdf
Optimal Energy. 2004. Economically Achievable Energy Efficiency Potential in New England. Prepared by Optimal Energy, Inc. for NEEP. November 17.	http://www.neep.org/files/Executive_Summary.pdf
Pew. 2005. Pew Center on Global Climate Change Web Site. State and Local News. New York Adopts New Energy Efficiency Standards. Accessed November 9, 2005.	http://www.pewclimate.org/what_s_being_done/in_the_states/news.cfm
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